16 fluid outlet

CLAIMS

1. Process for carrying out extractions whereby
- at least two immiscible fluid phases are mixed with one another, and
- at least one of the phases contains at least one substance that is extractable with the other phase,

and whereby the mixing is carried out by use of at least one static micromixer provided with at least one component in the form of a disk (1) and whereby said disk (1) has
- at least one inlet opening (2) for the introduction of at least one fluid stream into a linking channel (3) disposed in the plane of the disk and at least one outlet opening (4) for the outflow of the fluid stream into a mixing zone (5) disposed in the plane of the disk,
- whereby the inlet opening (2) is connected with the outlet opening (4) through a linking channel (3) disposed in a communicating manner in the plane of the disk and
- whereby the linking channel (3) before opening into the mixing zone (5) is divided by microstructure units (6) into two or more part channels (7), the widths of the part channels being in the millimeter to submillimeter range and being smaller than the width of the mixing zone (5)

2 Process as defined in claim 1, characterized in that the micromixer has a housing (11) with at least 2 fluid inlets (12a) and at least one fluid outlet (16), and the housing (11) contains at least one or more disk-shaped components (1) arranged into a stack.

3 Process as defined in claim 2, characterized by the use of several disks (1) superposed on one another so that the inlet openings (2) form subsidiary channels for introducing the liquid phase that is to be mixed, the mixing zones (5) together form a main channel for removing the mixed phase and the main channel and subsidiary channels extend through the stack.

4 Process as defined in claim 3, characterized in that the extraction agent is conveyed through the main channel and the phase containing the substance to be extracted is conveyed through at least one subsidiary channel of the micromixer.

5 Process as defined in one of the preceding claims, characterized in that at the outlet into the mixing zone (5) the widths of the part channels (7) of the disks (1) amount to 1 µm to 2 mm.

6 Process as defined in one of the preeceding claims, characterized in that the ratio of the greatest width of the linking channel (3) and/or the width of the inlet opening (2) to the width of

the part channels (7) of the disks (1) is greater than 2.

7 Process as defined in one of the preceding claims, characterized in that the ratio of the length to the width of the part channels (7) of the disks (1) is from 1:1 to 20:1.

8. Process as defined in one of the preceding claims, characterized in that the ratio of the width of the mixing zone (5) to the width of the part channels (7) of the disks (1) is greater than 2.

9. Process as defined in one of the preceding claims, characterized in that the disk (1) is additionally provided with at least one flow-through opening (9).

10. Process as defined in one of the preceding claims, characterized in that at least one of the inlet openings (2) or flow-through openings (9) or the mixing zone (5) of the disk (1) is enclosed by the plane of the disk and the linking channel (3) is formed by an indentation.

11. Process as defined in one of the preceding claims, characterized in that at least one of the inlet openings (2) or flow-through openings (9) or the mixing zone (5) of the disk (1) is disposed at the edge of the disk or as a recess at the edge of the disk.

12. Process as defined in one of the preceding claims, characterized in that the disk (1) is provided with at least two inlet openings (2) for at least two different fluid streams and each inlet opening (2) is connected with the mixing zone (5) through a linking channel (3).

13. Process as defined in one of the preceding claims, characterized in that the disk (1) is provided with two inlet openings (2) for two different fluid streams, each inlet opening (2) being connected with the mixing zone (5) through a linking channel (3), and the outlet openings (4) of the two linking channels (3) are disposed opposite one another.

14. Process as defined in one of the preceding claims, characterized in that the outlet openings (4) of the disk (1) are arranged on a circular line.

15. Process as defined in one of the preceding claims, characterized in that the disk (1) is provided with additional through-holes (12) and additional part channels (13) that are integrated into the microstructure units (6) and are separated from the part channels (7).

16. Process as defined in one of the preceding claims, characterized in that the linking channels (3) of the disks (1) are formed by indentations, and the linking channels (3) before opening into the mixing zone (5) are divided into part channels (7) by the microstructure units (6)

disposed on the disks (1).

17. Process as defined in one of the preceding claims, characterized in that the linking channels (3) of the disks (1) are formed by recesses in the disks (1), the disks being disposed as intermediate disks between a cover disk and a bottom disk, and the linking channels (3) before opening into the mixing zone (5) are divided into part channels (7) by microstructure units (6) disposed on the cover disks and/or bottom disks.

18. Process as defined in one of the preceding claims, characterized in that the flow rate of the fluid stream into the mixing zone (5) is greater than the flow rate of the fluid mixture within the mixing zone.

19. Process as defined in one of the preceding claims, characterized in that the mixing in the mixing zone occurs at least in part by turbulence.